

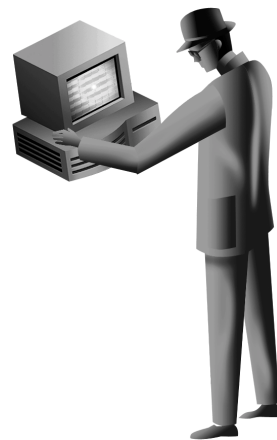


# PeopleSoft 8 Network Bandwidth Consumption

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## Disclaimer

The objective of this white paper is to compare consumption of bandwidth between different PeopleSoft 8 deployment architectures. This paper in no way makes recommendations of how PeopleSoft 8 should be installed. Performance of different setups may vary.

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# 1 Overview

PeopleSoft 8 HRMS is a complete Human Resources Management application package. This paper compares bandwidth consumption differences between utilizing a user's local Web Browser to access the PeopleSoft backend versus utilizing a Published Browser to access this resource. The business case for this comparison is to investigate if adding a MetaFrame component can decrease bandwidth utilization between users and a company's data center.

Previously PeopleSoft was deployed using a Two-Tier architecture. End-users required a client component to access the PeopleSoft Database. The latest HRMS architecture consists of a Web Server, an Application Server and a Database. With this new architecture, users can access information through their desktop's Web Browser. The Web Browser connects to the Web Server, which in turn contacts the PeopleSoft Application Server. By adding a MetaFrame component, Web traffic can be limited to a High Speed LAN and users can gain access to these resources through means of the Thin Client. Refer to Figure 1-1 below for a graphical representation.

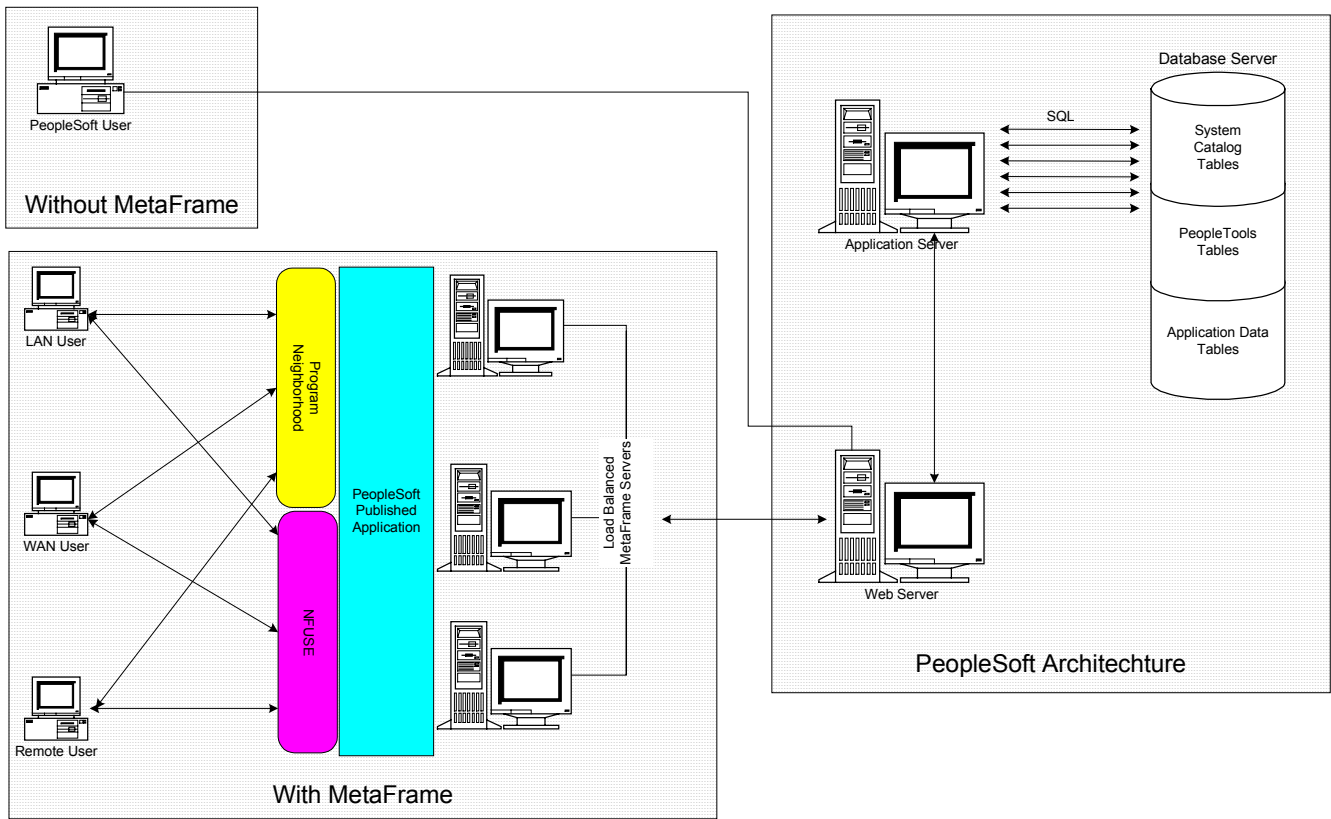


Figure 1-1 PeopleSoft 8 Deployment Diagram

## 2 Approach

In order to accurately measure the bandwidth savings associated with a MetaFrame deployment, the investigative team had to design a Testing Methodology, which included the following:

- **Lab Setup** – The investigation required a lab setup that allowed accessing the PeopleSoft resources through both the local Web Browser and the ICA Client. In addition, the setup needed to have the ability to measure the Web traffic generated by a PeopleSoft session and the associated ICA traffic sent to and from the ICA client. See Figure 2-1.
- **Documented User Scripts** – The investigative team documented typical user activity when using this Application Package. This information was used to develop scripts that were run from the client machine.
- **Network Monitoring** – In order to capture network traffic details such as peaks in traffic activity, eEye Iris 2.0 was installed to capture network packets.
- **Data Manipulation** – Raw data was manipulated using SQL to retrieve useful information such as Total Bytes sent, Average kbps and traffic peaks.

### 2.1 Lab Setup

The lab setup specified below was assembled in order to accommodate both access methods. The eEye Iris Software was loaded into specific machines to be able to capture both PeopleSoft traffic between Web Browser and Web Server (Typical Configuration) as well as the ICA Traffic generated by a MetaFrame session (PeopleSoft over ICA).

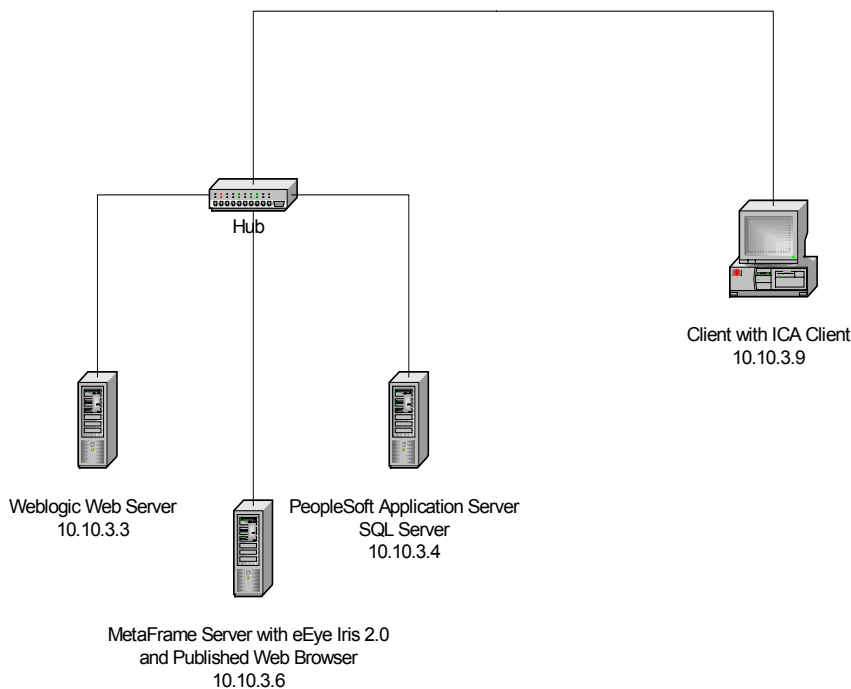


Figure 2-1: Network Diagram



The lab setup was configured using the following software and settings:

- Traffic generated in the session between the Web Browser and the BEA Weblogic Web Server is considered as the typical Client-Server traffic. This traffic is bound to port 7001 and is not SSL encrypted.
- ICA Traffic is generated in the session between the ICA Client and the MetaFrame Server. It is bound to port 1494. For standardization purposes between the compared architectures, the ICA session was configured to use basic encryption and True color depth.

Web Server	MetaFrame Server	Application Server and Database	Client
<ul style="list-style-type: none"> <li>▪ Windows 2000 Server with SP 1</li> <li>▪ BEA WebLogic</li> <li>▪ PeopleSoft Internet Architecture</li> </ul>	<ul style="list-style-type: none"> <li>▪ Windows 2000 Server with SP 1</li> <li>▪ MetaFrame 1.8 with FR 1</li> <li>▪ Office 2000 Premium</li> <li>▪ Internet Explorer 5</li> <li>▪ eEye Iris 2.0</li> </ul>	<ul style="list-style-type: none"> <li>▪ Windows 2000 Server with SP 1</li> <li>▪ SQL Server 7.0 with SP 3</li> <li>▪ PeopleSoft Edition of BEA Tuxedo 6.5 / BEA Jolt 1.2</li> <li>▪ PeopleSoft HRMS 8 SP 1</li> <li>▪ Seagate Crystal Reports for PeopleSoft</li> <li>▪ SQR Server 6.14 for ODBC</li> </ul>	<ul style="list-style-type: none"> <li>▪ Windows 2000 Server</li> <li>▪ Citrix ICA Client 6.00.910</li> </ul>

## 2.2 Documented User Scripts

In order to create “real world” usage scripts, the investigative team interviewed two Citrix Systems HR Professionals proficient with this Application. Core information such as frequency of tasks, length of sessions and input speed were gathered and compiled into a single script. This script included the following usage scenarios:

- **Scenario I** – Run Any Query
- **Scenario II** – Obtain Job Summary
- **Scenario III** – Obtain Position Data
- **Scenario IV** – Hire an Employee
- **Scenario V** – Run EMPLOYEE\_SALARY\_PS\_NVISION Query

**Note:** Please refer to Appendix A for the step-by-step scripts.

## 2.3 Network Monitoring

It was unnecessary to have the users repeat their tasks on both architectures. This was because the network analysis that was performed was able to simultaneously monitor PeopleSoft traffic and ICA traffic. Iris 2.0 was installed on the MetaFrame server to accomplish this. Because the Web Browser is running on the MetaFrame server exactly as it would from the desktop, the PeopleSoft traffic generated is identical to the traffic that would be generated on the desktop by performing the same task. Using this approach ensures that the network analysis of ICA is closely linked to the actual PeopleSoft activities, thereby ensuring an accurate comparison of ICA to PeopleSoft traffic.

As mentioned earlier Web Traffic is bound to Port 7001 and ICA Traffic is bound to Port 1494. Based on this knowledge the investigative team was able to filter all other network traffic such as broadcasts.

The eEye Iris log file contains 9 columns of data. These are explained below:

- **No** - Id for captured packet, number 0-2000.
- **Timestamp** - Time the packet was captured, in milliseconds
- **Type** - Basic type of traffic, usually IP.
- **Protocol** - Protocol type of the captured packet.
- **IP\_Src** - The IP address of the network host that originated the packet.
- **IP\_Dest** - The IP address of the network host that is the packet's destination.
- **Port\_Src** - The Port on the network host that originated the packet.
- **Port\_Dest** - The Port on the network host that is the packet's destination.
- **Size** - The total size of the captured packet, in bytes.

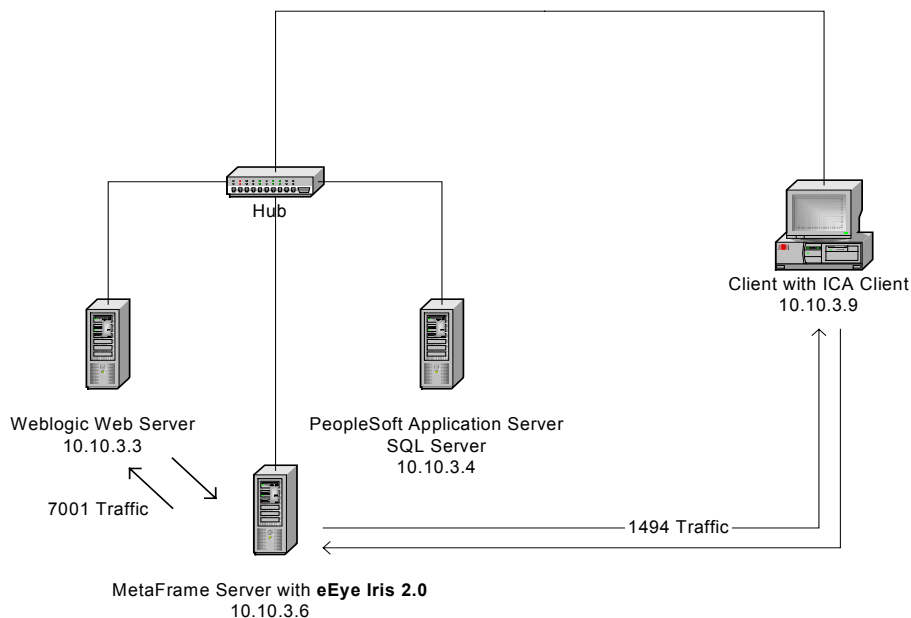


Figure 2-2: PeopleSoft 8 Setup for analyzing both scenarios simultaneously



## 2.4 Data Manipulation

SQL was utilized to manipulate the Raw Packet Detail before being able to plot traffic data. SQL was especially useful to achieve the following:

- Aggregate detail on a per minute basis
- Filter traffic into the ICA IN, ICA OUT, PS IN and PS OUT categories using port assignments as well as Source and Destination IP addresses.
- Find Total Bytes transmitted inside a session
- Find Average network utilization inside a session

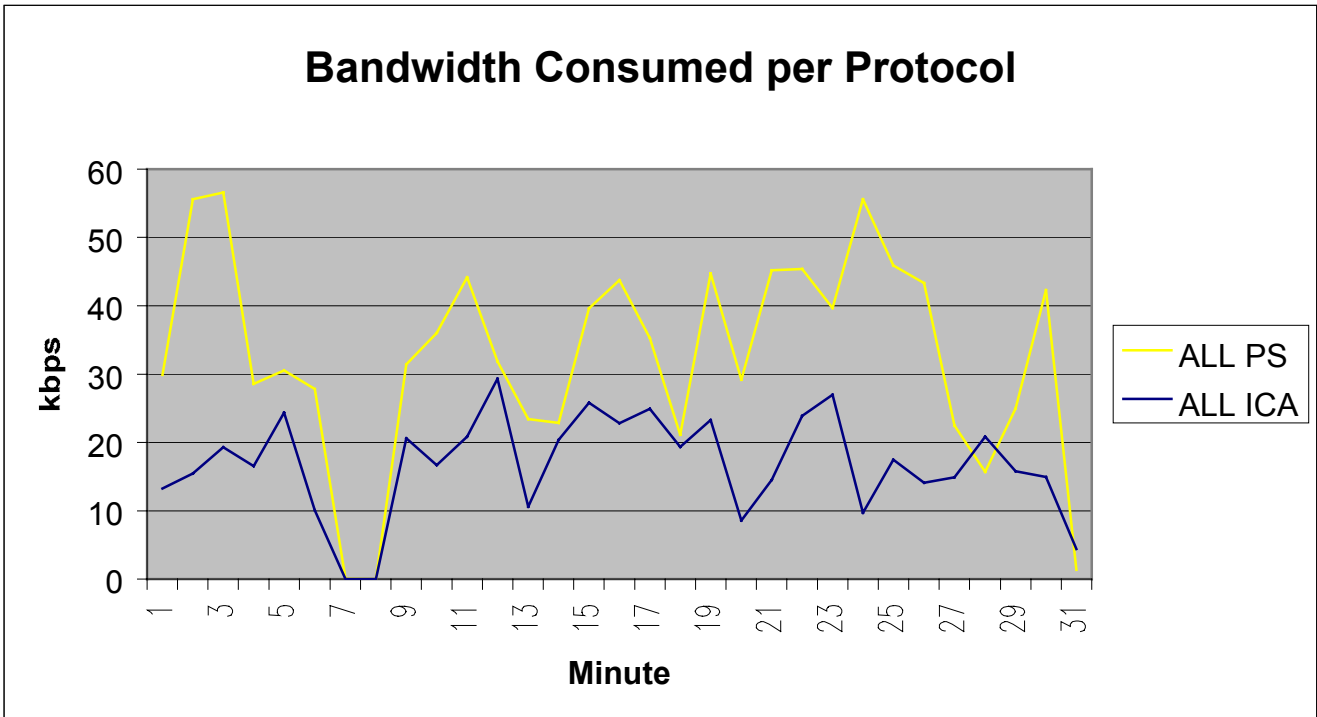
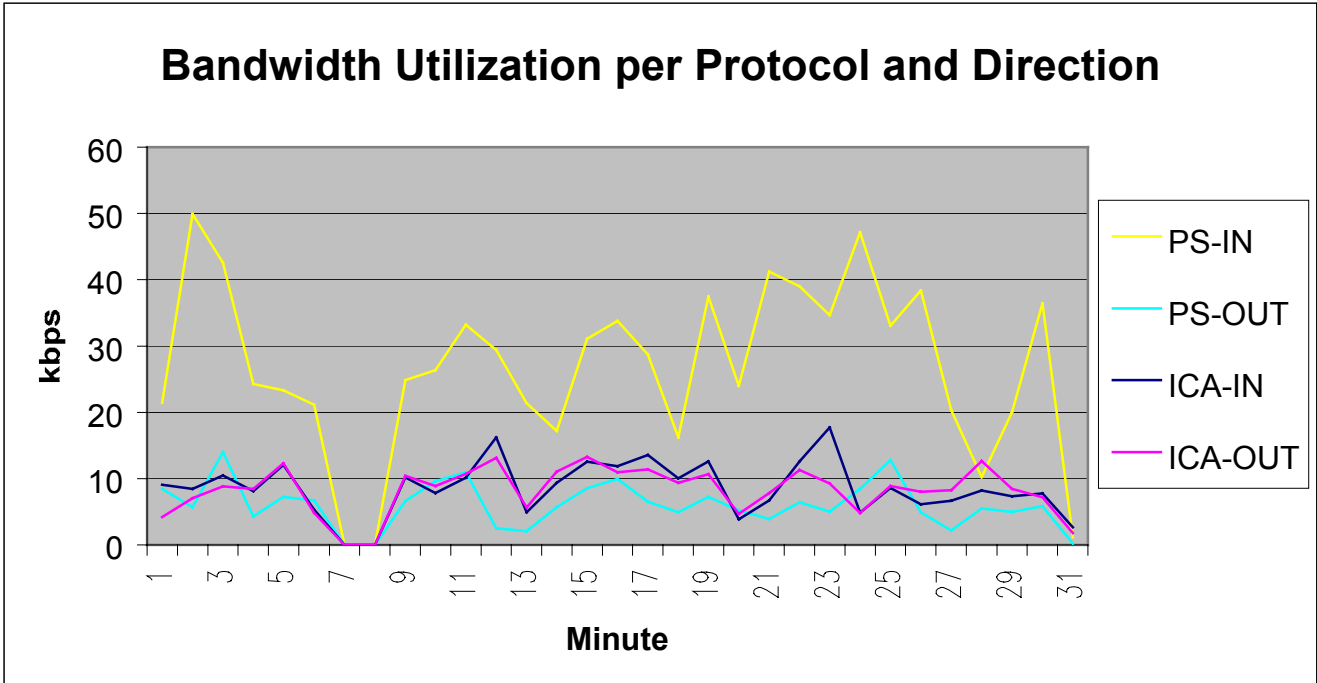
## 3 Results and Conclusions

### 3.1 Network Utilization

Network Utilization over a 30 minute Time Period				
	ICA-IN	ICA-OUT	PS-IN	PS-OUT
<b>Average (kbps)</b>	8.58	8.20	26.71	6.01
<b>Maximum (kbps)</b>	17.72	13.27	49.90	14.00
<b>Average Packet Size (bytes)</b>	97.64	67.22	791.30	336.61
<b>Total Bytes Sent</b>	2041881	1952762	6358859	1431939

	ICA Session	PS Session
<b>Average Total Utilization (kbps)</b>	16.78	32.72
<b>Maximum Total Utilization (kbps)</b>	29.33	56.57

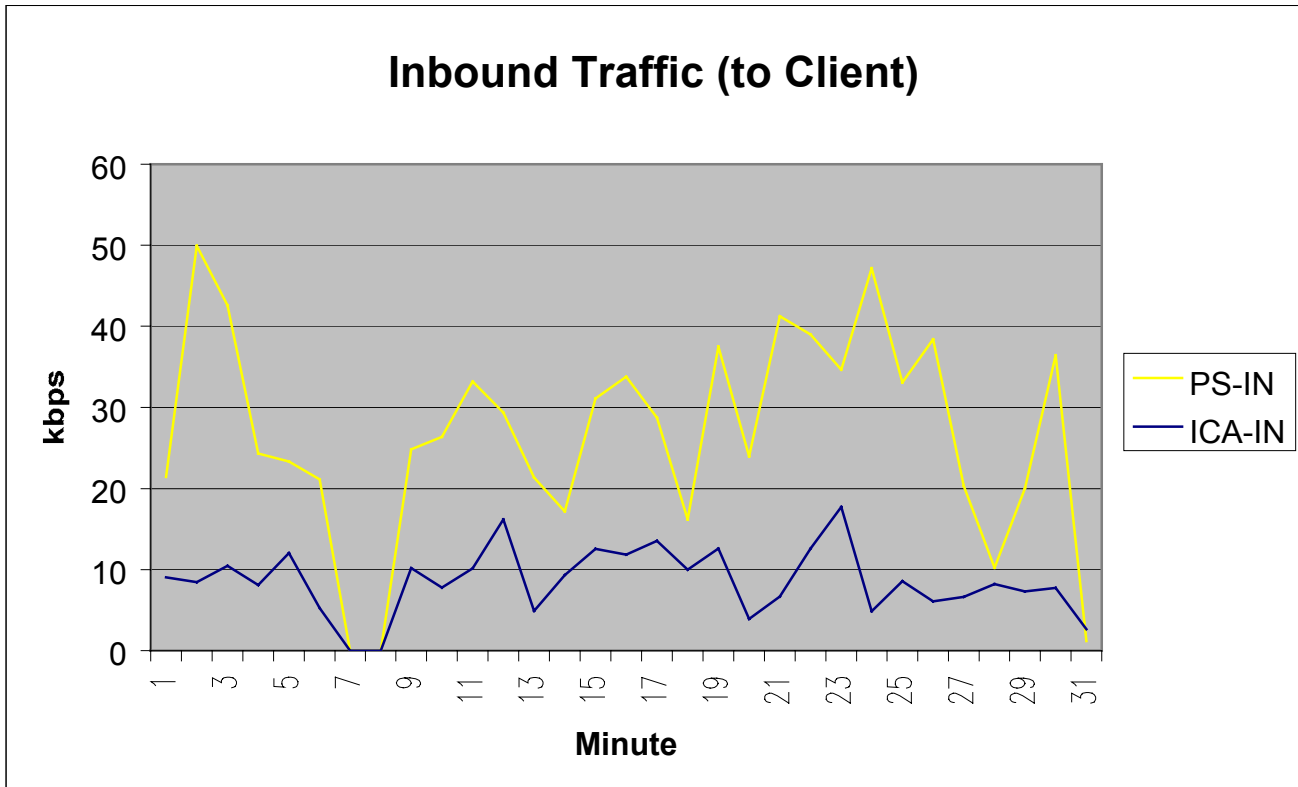
As evidenced above, average bandwidth consumption is reduced by 51.29% when running PeopleSoft over ICA. The maximum peaks are also reduced by a comparable amount (48.16%) when the application is accessed over the ICA protocol.



The graphs above show MetaFrame’s effectiveness in reducing the bandwidth consumption peaks associated with running this application. Pronounced peaks in PS-IN traffic are due to the fact that the Web Server is sending entire pages to the Web Browser each time the user makes a request. The ICA-IN traffic is limited to screen updates, which are handled by Citrix’s

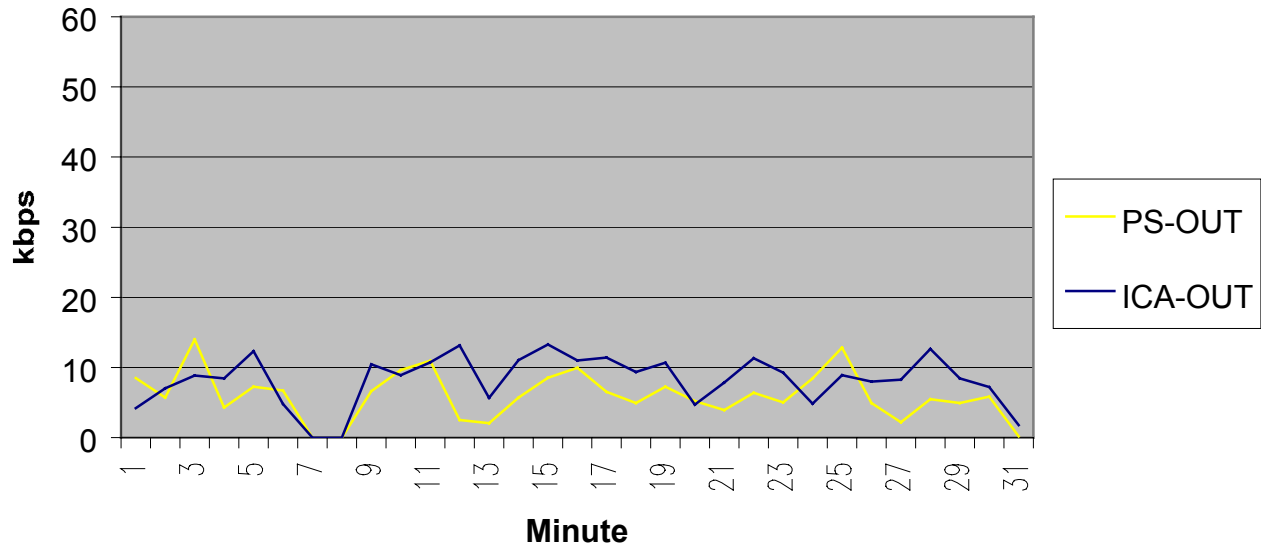


SpeedScreen Technology. PS-OUT is low in comparison to PS-IN traffic because it consists only of requests for web pages. ICA-OUT on the other hand, consists of keystrokes and mouse movements, but is still comparable in level to PS-OUT traffic.





### Outbound Traffic (from Client)





## 3.2 Conclusions

The results of this analysis indicate that users in a low bandwidth environment could benefit from operating the PeopleSoft 8 applications through a MetaFrame ICA connection. The tests performed in this analysis focused solely on the HRMS test system available with PeopleSoft 8, but we would expect a similar trend should a more detailed analysis be performed in the future. As a result of this testing, the data analysis highlighted three key factors that indicate a complementary relationship between PeopleSoft 8 and a Citrix MetaFrame implementation:

- **Average bandwidth consumed** - Less average bandwidth is consumed when accessing the PeopleSoft 8 HRMS applications from the ICA Client. When running PeopleSoft 8 over ICA, the traffic generated by this application is approximately 51% less than the raw HTTP traffic generated by the PeopleSoft 8 HRMS applications.
- **Network Traffic Bursts** - The proto-typical PeopleSoft 8 deployment used in this analysis displayed higher peaks in bandwidth utilization than the deployment over ICA. While the highest peak over ICA was 29.33 kbps, the highest peak using the typical PeopleSoft architecture was 56.57 kbps.
- **Serviced Users** – By virtue of reducing the bandwidth required to run this application, the enterprise will be able to accommodate additional users without affecting the performance of the application or the overall user experience. By extrapolating the results of the capture analysis we can observe the implications of this benefit.

By providing users with a network circuit that can better accommodate significant bandwidth bursts from multiple users, the enterprise can ensure consistent application performance. Following these guidelines, the following table depicts the additional amount of users that could be serviced by running the application over ICA, assuming a constant peak bandwidth utilization matching the 29.33 Kbps found in the analysis.

Maximum System Capacity based on maximum observed network traffic bursts:			
Pipe Size	Max Users Serviced (Typical Config)	Max Users Serviced (Over ICA)	Additional Users
128 Kbps	2	4	2
512 Kbps	9	17	8
1.544 Mbps (T1)	27	52	25

Furthermore, as additional users are placed on the available network circuit, the 'peaks and valleys' observed through individual utilization lose importance. This is because the overall average utilization becomes more critical, as the network circuit must be able to sustain a more constant stream of network requests and replies. This view suggests that not all users induce traffic bursts at the same point in time and the overall bandwidth requirement is better reflected by the average bandwidth consumed by each user. This assumption can only be made when multiple users are serviced. The following table depicts the additional amount of users that could be serviced by running this application over ICA, assuming a constant average bandwidth utilization matching the 16.78 Kbps found in this analysis:

Maximum System Capacity based on Average Load			
Pipe Size	Max Users Serviced (Typical Config)	Max Users Serviced (Over ICA)	Additional Users
512 Kbps	15	30	15
1.544 Mbps (T1)	47	92	45



## 4 Next Steps

The scenarios and conclusions presented in this analysis are meant to illustrate in real terms the data observations gathered from this analysis. This analysis focused solely on one group of applications, the HRMS system, within the PeopleSoft 8 application. If possible, a more detailed analysis should be undertaken to capture the same level of detail from a number of PeopleSoft 8 Enterprise implementations. The data captured from these 'real-world' scenarios would prove invaluable in better understanding how Citrix MetaFrame could complement a PeopleSoft 8 implementation.

Further, we recommend investigating other modules of PeopleSoft 8, such as PeopleSoft Financials. Because of the nature of this module, there are more data transactions between the client and the data center, which in turn might generate a greater level of network traffic/bandwidth bursts. As evidenced by this investigation, MetaFrame can help to offset the network issues that accompany this type of network utilization, and assist clients with creating a stable and consistent network environment.

**Note:** A scenario using the "Self Service" functionality would have made the script more representative of PeopleSoft Usage across the enterprise. The Evaluation PeopleSoft license used for this analysis did not include that functionality.



## 5 Appendix A: Detailed User Scripts

### Scenario I – Run Any Query

1. Logon as SystemAdmin
2. Click PeopleTools
3. Click Query Designer
4. Click Use
5. Click Create New Query
6. Go back
7. Click Run Query
8. Run any of the 249 queries that come up
9. Click Download Results in an Excel Spreadsheet

### Scenario II – Obtain Job Summary

1. Click Administer Work Force
2. Click Administer Work Force
3. Click Inquire
4. Click Job Summary
5. Pick “employee” in Personnel Status
6. Click Search
7. Pick any employee

### Scenario III – Obtain Position Data

1. Click Develop Workforce
2. Click Manage Positions
3. Click Use
4. Click Position Data
5. Change Position Status to “Approved”
6. Click Search
7. Select a file



## Scenario IV – Hiring an Employee

1. Click Administer Workforce
2. Click Administer Workforce
3. Click Use
4. Click Hire
5. Click Add
6. Click Personal Data
7. Click Name Tab
8. Fill in last name, MI, first name
9. Select US Flag
10. Choose smoker/non
11. Click Address Tab
12. Fill in Address
13. Fill in Mailing Address
14. Fill in Email
15. Fill in Phone
16. Click Personal Profile Tab
17. Select Gender
18. Select Education
19. Select Eligibility/Identity
20. Fill in Birth date
21. Select National ID
22. Click US Flag
23. Select Ethnic Group
24. Click Job Data
25. Select Work Location
26. Click Action/Reason
27. Click Look up button
28. Click Look up
29. Pick NPS
30. Click Company
31. Click Look up



32. Click Look up
33. Pick AB
34. Click Business Unit
35. Click Look up
36. Click Look up
37. Pick FEDBE
38. Click Department
39. Click Look up
40. Click Look up
41. Pick any
42. Click Job Information
43. Click Job code
44. Click Look up
45. Select US Flag
46. Pick any
47. Click Payroll
48. In Payroll System choose "Payroll Interface"
49. Click Benefit Program Participation
50. Click Save

## **Scenario V – Run EMPLOYEE\_SALARY\_PS\_NVISION Query**

1. Click Run query
2. Click PeopleTools
3. Click Query
4. Click Search
5. Click EMPLOYEE\_SALARY\_PS\_NVISION
6. Click Download results in an Excel spreadsheet



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